NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD

AGRICHEMICAL HANDLING FACILITY
(No.)
CODE 702i

DEFINITION

The Agrichemical Handling Facility (AHF) is a permanent structure providing an environmentally safe area for storage, handling and mixing of on-farm liquid agrichemicals, such as fertilizers and pesticides.

PURPOSE

To protect the environment by containing, collecting and storing on-farm agrichemicals during mixing, loading, unloading and rinsing operations.

CONDITION WHERE PRACTICE APPLIES

This standard applies where liquid fertilizers and pesticides (including herbicides) are stored, mixed, loaded/unloaded and, and where equipment is cleaned. This standard does not address the handling of anhydrous ammonia.

CRITERIA

An AHF shall be designed to meet current Ohio Department of Agriculture (ODA) and federal requirements.

All components of the facility shall have a minimum 10-year functional design life.

Fertilizer storage tank(s) and their secondary containment areas shall be isolated from pesticide storage and their secondary containment areas. Fuels and petroleum products will not be stored within the confines of the AHF.

Consider soil and land characteristics when constructing an AHF, to prevent contamination of surface or groundwater caused by drainage runoff or leaching; include buffers designated on pesticide product labels if needed.

Field tile within the construction area are to be located, and if found relocated at least 15 feet away from the sidewall or outside slope toe of the facility unless the subsurface discharge can be monitored, and the design incorporates provisions to recover the water and direct it to the rinsate tank.

Pesticide mixing and loading facilities must meet the setback distance criteria on the appropriate pesticide label. For example, Atrizine is labeled with the following setbacks:

- May not be mixed, loaded or used within 50 ft. of all wells including abandoned wells, drainage wells, and sinkholes.
- May not be mixed or loaded within 50 ft. of intermittent streams and rivers, natural or impounded lakes and reservoirs.

Location

The Agrichemical Handling Facility shall have the following minimum setback distances:

- 300 ft. from neighboring residences
- 1000 ft. from an OEPA designated drinking water source protection area
- 50 ft. from any well

To minimize the potential for contamination of streams, facilities should be located outside of flood plains. However, if site restrictions require location within the flood plain, protect the facility from inundation and damage from a 25-year frequency flood event, or larger event if required by State and local laws, rules or regulations.

The Federal Emergency Management Agency (FEMA) has designated Established Regulatory Floodways in the floodplains of some Ohio rivers and streams. Do not locate facilities within an Established Regulatory Floodway.

Keep the AHF downwind and downhill from sensitive areas such as houses, gardens, recreation areas and ponds.

Soil and Foundation

A subsurface geological exploration is required for all facilities to determine conditions that may adversely affect groundwater quality. The exploration is to extend a minimum of three feet below the planned bottom of the secondary containment area.

Where available, use the Ohio Department of Natural Resources, Division of Water, Ground Water Pollution Protection (DRASTIC) Maps to determine the pollution potential for each site. Areas having a pollution potential index above 160 indicate a high potential to pollute groundwater. All sites in a high pollution potential area identified from DRASTIC maps, nearby well logs, the geologic investigation, or within an EPA designated Sole Source Aquifer boundary, will require a concrete lined loading/ mixing pad and secondary storage containment area.

Agrichemical Handling facilities shall not be located in areas where subsurface drainage is required to lower the groundwater elevation below the facility, unless the subsurface discharge can be monitored, and the design incorporates provisions to recover the water and direct it to the rinsate tank.

Rainfall and Runoff Exclusion

Roofed mixing/loading pads are recommended to prevent the transfer of contaminated water.

Measures shall be designed to divert clean water and to collect the potentially contaminated runoff resulting from a 25-year, 24-hour frequency storm event from the

loading/mixing and storage areas. Roofing may be used to facilitate rainwater exclusion for the AHF.

Stormwater discharges during non-use periods will be as permitted by ODA and addressed in the Operation and Maintenance Plan

Components

The system for an AHF shall include those components necessary to properly handle chemical mixtures and prevent pollution of the environment. Components of a complete facility may include, but are not limited to, the following:

- Fertilizer and pesticide storage along with secondary containment areas;
- A curbed, sealed concrete chemical mixing and loading pad;
- All weather access pad/lane to the containment facility;
- A chemical collection sump and sump pump, including safety devices;
- An adequate water supply for mixing chemicals, rinsing tanks and containers, and for emergency health and safety needs including water supply pump, pipeline, hoses, back-flow prevention devices and other hardware as needed;
- Tanks for storage of rinsate and potentially contaminated runoff;
- An Operation and Maintenance Plan.
- An Emergency Safety Contingency Plan.

Secondary Containment Facility

Where a Secondary Containment Facility (SCF) is required for environmental protection from rupture or leakage of agrichemical tanks, it shall be water tight and designed to have a net volumetric capacity of not less than 110 percent of the largest storage tank within the facility. The net volumetric capacity is determined by subtracting the displacement of other tanks in the facility from the secondary containment volume.

The base of any permanent storage vessel over 15 ft in height shall be no less than four feet from the inside base of the secondary containment facility dike or wall. The base of any permanent storage vessel less than 15 ft. in height shall be no less than two feet from the inside base of the secondary containment facility dike or wall.

The minimum height of any secondary containment facility wall or dike above the finished containment facility floor, or granular material placed on the containment floor is 12 inches.

The structural design for walls must account for the hydrostatic loading of the material. The density of the liquids planned for storage need to be determined since the density can range from 70 to over 100 lb/ft^3.

To the extent possible, the facility should be planned so that all transfer pumps and valves are located within the secondary storage containment area and so that only transfer hoses are within the loading/ mixing pad area. Each transfer pump should be within an individual containment structure to minimize the cleanup resulting from seal leaks, and to prevent mixing of chemicals transferred by multiple pumps.

Storage tanks within the secondary containment area must be secured to prevent flotation induced by fluids in the secondary containment area. If permitted by ODA, liquid permanently left in tanks can be used to prevent flotation, otherwise flotation forces are to be calculated considering an empty tank when the secondary containment is full of fluid. Anchoring cables are not to penetrate synthetic liners. Floatation prevention shall be addressed in the Operation and Maintenance plan provided to the operator.

When the facility is unroofed, a sump pump shall be provided within the secondary containment facility. For temporary storage of contaminated rainfall, a rinsate tank (1000 gallons minimum capacity) shall be installed within the secondary containment facility for pesticide containment facilities and is recommended for fertilizer containment facilities.

The SCF for pesticides shall be concrete, or a custom engineered secondary containment system.

The SCF for fertilizer may be constructed by any of the following methods:

- Concrete floor and walls/ curbing.
- Post and plank walls faced with a synthetic liner, with a concrete floor, or earthen floor faced with a synthetic liner.
- Compacted earthen impoundment faced with a synthetic liner.
- Compacted earthen impoundment with a hydraulic conductivity rate not to exceed $1x10^{-5}$ cm/sec.
- Custom engineered secondary containment system.

Suppliers of custom-engineered secondary containment systems are responsible for the design and construction of the facility, and must provide written certification that the completed facility meets this standard and has been approved by ODA.

Secondary containment with vertical walls should not exceed 3 ft. in height for ease of ingress & egress. Higher walls should be equipped with steps for user access. Where steps are installed within a lined containment, measures shall be made to protect the liner from puncture.

Synthetic liners used for secondary containment shall meet the following minimum criteria:

- Liners designed to perform without soil cover shall have a minimum functional design life of ten years when fully exposed to the outside climate.
- The minimum thickness for any liner shall be 30 mils, however for increased durability, 60 mil High Density Polyethylene (HDPE), 40 mil Linear Low Density Polyethylene (LLDPE), or 36 to 45 mil Reinforced Polypropylene (RPR) is recommended.
- The liner material shall be resistant to deterioration from the chemicals and ultraviolet light within the storage area.
- The liner shall be placed on a smooth compacted base free of soil clods or angular stones exceeding ½ in size. Ruts from construction equipment are to be no more

than 1 in deep, or ½ in deep in frozen subgrade. If the surface can not be sufficiently prepared for direct placement of the liner, the liner shall be placed on 4 inches of compacted sand, or 8 oz./ yd^2 (minimum) non woven geotextile fabric, or as recommended by the manufacturer.

- The liner shall be protected from puncture or damage by permanent storage tanks placed on the liner, and from foot traffic during facility operations. A recommendation is to place 8 oz./ yd^2 (minimum) non woven geotextile fabric followed by 4 inches (minimum) of AASHTO #8 bank run gravel on top the synthetic liner before the tanks are installed. When gravel is used, the constructed height of the containment facility shall be increased by the gravel thickness.
- The supplier shall provide written evidence that the synthetic liner selected is specifically designed for the intended chemicals stored.
- Synthetic liners requiring field seaming shall be installed by an installer approved by the liner manufacturer, or certified by the International Association of Geosynthetic Installers (AIGI). All field-constructed seams shall be tested and repaired in accordance with the liner manufacturer's recommendations. The landowner shall be provided with a log of test results.
- Prefabricated synthetic liners shall be fabricated by companies approved by the liner manufacturer. The liner shall be installed per the instructions provided by the fabricator, and the installation contractor shall certify to the landowner that the liner was installed per the instructions.
- Geosynthetic clay liners (GCL) shall be permanently covered with a minimum of 12" of soil or fine granular material
- Synthetic liners shall be anchored at the top of the slope with a trench using these minimum dimensions (the liner shall cover the trench perimeter):
  - 2 ft. horizontal run out from the top of slope to the anchor trench
  - 1 ft. deep vertical trench
  - 18 inch trench width

Earthen Dike

- The minimum top width shall be 6 ft.
- The combined side slopes for the settled embankment shall not be less than 5 horizontal to 1 vertical.
- The settled embankment slope shall not be steeper than 2 horizontal to 1 vertical.
- Unlined earthen impoundment's will be topped with 6 inches of topsoil and seeded following Conservation Practice Standard 342 – Critical Area Planting
- The design of unlined earthen impoundments shall be based upon lab data to determine the required soil density, compaction and moisture requirements. The landowner shall provide for the lab testing of the soils by qualified personnel.
- Field hydraulic conductivity tests must be taken on unlined earthen impoundments. The landowner shall provide for the field testing of the soils by qualified personnel. If the hydraulic conductivity rate exceeds $1x10^{-5}$ cm/sec, the impoundment shall be faced with a synthetic liner.
- Dikes constructed to be faced with a synthetic liner shall meet these minimum requirements:

- *Precompacted Lift thickness:* not to exceed 9 inches in total thickness.
- *Maximum rock diameter:* 2 inches.
- *Minimum Moisture content:* - The soil material shall be of sufficient moisture that when the soil material is formed into a firm ball, the ball will not develop any cracks when deformed by hand.
- *Compaction equipment:* sheepsfoot roller with 200 psi minimum rating.
- *Compaction effort:* a minimum of 4 passes of the roller over all points of each lift.
- Additional water needed for proper compaction will be thoroughly mixed in with a disk prior to compaction.
- The finished surface of the fill and bottom of the SCF shall be rolled with a smooth roller in preparation of the liner placement.

Loading / Mixing Pad

- The minimum size of the pad used shall be the length and width of the largest sprayer, with the booms folded in, plus 10 feet.
- The pad shall be designed for equipment wheel loads.
- All pads shall be watertight where depth to groundwater is a concern or the pad is located within a designated high pollution potential area.

A fertilizer loading pad may be constructed of crushed aggregate as long as transfer pumps are located within the storage area and measures are taken by the facility operator to collect any spillage/leakage from the hose connections that occur during the loading process. Concrete pads may be Type S-1 or S-2.

Pesticide loading/mixing pad. All pads designed for pesticide handling shall be watertight concrete and equipped with a sump and rinsate tank system. The pad may be integrated into the secondary containment volume.

The pad for facilities that include pesticides shall be a concrete slab-on-grade with positive slope from all areas toward the sump that is then directed into a rinsate tank.

The pad, sump and rinsate tank combined shall have the capacity to contain the larger of:

- The volume of 25-year, 24-hour frequency rainfall on the pad, or
- 110% of the volume of the largest chemical or spray tank on the pad.

The rinsate tank shall be sized to contain 100% of the volume of the largest chemical or spray tank on the pad.

Concrete. The concrete pad design shall consider the required performance and the critical applied loads, and be designed for water tightness. If joints are necessary, they will have water stops installed or a preapproved joint sealant used. The subgrade material must be evaluated as to suitability and uniform density. A 4-inch thick layer of crushed gravel or limestone shall be provided as a uniform subbase. Where the subgrade is uniform and dense, a Type S-1 concrete slab is acceptable. Type S-2 concrete slabs shall be used where the subgrade material is non-uniform or has variable density, and it is not economical or feasible to improve the subgrade. The subgrade thickness in question is generally 12 inches, but could be more, depending on the soil profile. Type S-3 concrete slabs shall be used when the contraction joint spacing is to be more than 15 feet or when no contraction joints are desired. Sawed contraction joints will be filled with elastomeric sealers. Design criteria for Type S-1, S-2 and S-3 concrete

slabs are found in the NRCS Concrete Construction Specification (210-VI-EFH, Amend OH-17, February 14, 2000).

The NRCS Concrete Construction Specification shall be modified as follows for concrete placed within this standard.

- The water cement ratio shall not exceed 0.45
- Type IIA cement should be specified, however Type IIA cement if not available, facilities constructed using type I or IA cement shall be coated with a flexible protective sealant. Sealing and joint materials must be designed to remain flexible after curing, aging, cold weather, sunlight, and exposure to anticipated agrichemicals, loads and traffic. The sealant will be applied following the concrete curing per the manufacturers instructions.

Sump

Any sump used shall be designed to withstand any anticipated loads and to prevent flotation. Sump capacity should be based upon sump pump requirements and any grit accumulation anticipated. The sump shall be constructed to be watertight. If constructed of concrete, the floors and walls shall be 6-inch minimum thickness, with reinforcement as needed for structural requirements but not less than No. 4 bars on 12-inch centers in each direction. Sumps constructed of stainless steel or polyethylene material shall also be acceptable. A cast iron grate shall be constructed over all sumps. A waterstop will be used between the sump walls and the concrete pad during construction to insure a watertight connection. Where a synthetic liner is used, attachment to the sump shall be made as per the liner manufacturer recommendations to assure water tightness.

The bottom of a secondary containment may be graded to a low corner to accommodate a sump pump in lieu of adding a sump. Synthetic liners must be protected from damage from pump scour when this procedure is used.

Sump Pump

The sump pump shall be selected to provide the discharge rate at the head requirements of the site. The pump shall be made entirely of materials recommended by the manufacturer for use with the type of agrichemicals it will convey. The type of pump selected should also consider the possibility of pumping grit.

All electrical components shall be waterproof and explosion proof, and shall be installed in accordance with local and national electrical codes.

The sump pump outlet shall not be connected to a tile or pipeline that would allow a direct discharge outside the loading/ mixing pad or secondary containment area.

Roof

Where a roof is desired, the design shall meet all local and state codes if applicable, or the roof shall meet snow and wind loads as specified in ASAE EP288.5, Designing Buildings to Resist Snow and Wind Loads.

NRCS pre-approved roof drawings and specifications may be used where applicable. Where non-preapproved drawings are to be used, the landowner shall submit design computations and specifications prepared by a registered professional engineer for the

roof and its supporting members to the State Conservation Engineer for approval/ acceptance prior to the AHF installation.

Water Supply

A reliable water supply to the pad with a minimum of 5 gallon per minute is recommended. Backflow prevention, antisiphoning devices, and a method for winterizing of the pipelines shall be installed on all water supply lines.

Storage/Rinsate Tanks

All tanks (sometimes referred to as Permanent Storage Vessels) shall be constructed entirely of materials recommended by the manufacturer for the use with the type of agrichemical to be stored. The tanks shall be permanently installed and anchored to prevent flotation. The contents will be clearly labeled on the outside of the tanks.

The tanks will meet all ODA requirements for Permanent Storage Vessels.

All secondary containment facilities (SCF's) shall meet or exceed ODA requirements.

Safety

An emergency washing faucet, emergency eyewash station, and a drop shower is recommended.

Federal, State and Local Laws

Those planning and designing chemical handling and mixing facilities will strictly adhere to all federal, state and local laws. Specific requirements for pesticide storage and handling are regulated by the Ohio Department of Agriculture, Division of Division of Plant Industry, Pesticide Section. The Ohio Department of Agriculture, Division of Plant Industry, Feed and Fertilizer Section regulate specific requirements for Fertilizer storage and handling.

Producers will be responsible for securing the necessary permits to install the required facilities and for properly managing the facility.

PLANS AND SPECIFICATIONS

Plans and specifications for constructing Agrichemical Handling Facilities shall be prepared in accordance with the criteria contained in this standard and shall describe the requirements for applying this practice to achieve its intended use.

The following statement shall appear on all construction drawings for AHF's:

> Management of agrichemicals shall be the responsibility of the owner/operator and shall be in accordance with the Ohio Department of Agriculture's (ODA) regulations as well as all other applicable federal, state and local regulations.
>
> The installation of additional tanks above what was originally planned for the Secondary Containment Facility may affect the structure's storage capacity and compliance with ODA's regulations.

Any constructed facility to contain a new permanent storage vessel (any tank or combination of tanks having an aggregate capacity of more than 5000 gallon capacity) shall have the plans and specifications approved by the ODA prior to NRCS construction assistance. The ODA application and facility sizing forms are available as job sheets to this standard on the Ohio NRCS web site.

OPERATION AND MAINTENANCE

An operation and maintenance (O&M) plan shall be developed that is consistent with the purpose of this practice. The O&M plan will reference the Ohio Department of Agriculture regulations for the operation of this facility. The plan will also include the following:

1. Location and components for the facility in question. This should include a brief description of the facility. Include the number and capacity of all fertilizer and pesticide tanks.
2. Liquid volume remaining in the tanks to prevent tank flotation (when approved by ODA) or maintenance of structural flotation control when applicable.
3. If a Secondary Containment Facility is constructed, discussion should be made of any weekly, monthly, and annual maintenance that might be necessary for maintaining the facility. The size of the largest tank the facility was designed for should also be noted.
4. If a Chemical Loading/Mixing pad is constructed, discussion should be made of any weekly, monthly, and annual maintenance that might be necessary for maintaining the concrete, sump, sump pump and hoses.
5. Earthen dikes and synthetic liners must be inspected for damage by equipment or rodents. Provisions for immediate repair of damage to a synthetic liner must be available at all times.
6. When accumulated rainwater is to be pumped out of a fertilizer secondary containment facility (instead of into a rinsate tank), the O&M plan shall address the testing requirements to satisfy OEPA water quality standards.
7. A written discharge response plan shall be made a part of the O&M plan. Emphasis shall be made in the O&M plan on maintaining written inspection and maintenance reports in accordance to ODA regulations. Reference shall be made to periodic updates to the discharge response plan for the storage facility in the event of a spill.

References

Midwest Plan Service, MWPS-37, Designing Facilities for Pesticide and Fertilizer Containment, Revised First Edition, 1995, Ames Iowa

Ohio Department of Agriculture, Division of Plant Industry – Feed and Fertilizer Section

Ohio Administrative Code Chapter 901:5-2

Ohio Department of Agriculture, Division of Plant Industry – Pesticide Section

Ohio Administrative Code Chapter 901:5-11

OSU Extension Factsheet AEX-522-93, The Ohio State University

International Association of Geosynthetics Installers membership directory is available by calling 615-255-6952, or by e-mail to: iagi@ifai.com